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NOTES ON UREDINEAE. II.

E. W. D. HOLWAY.

PUCCINIA CARICIS-ASTERIS Arthur.

An abundance of this Puccinia was found in 1902 on *Carex sparganioides* Muhl., following an aecidium on *Aster sagittifolius* Willd. growing with it. No other Aecidium or Puccinia was to be found in the vicinity. Plants of the Aster from another locality were placed in the greenhouse in 1903; teleutospores from the *Carex* were sown on them April 26; spermogonia appeared May 4 and aecidia May 13; a second sowing was made May 6; spermogonia appeared May 12 and aecidia were collected May 17 and May 20. The last infection was very strong, the plant being covered with aecidia, as the germinating teleutospores were scraped off into water and placed over the entire plant.

PUCCINIA ALBIPERIDIA Arthur.

Teleutospores from *Carex pubescens* Muhl. were sown on *Ribes gracile* Mx., April 26, 1903; aecidia were collected on May 16; spermogonia appeared in great abundance. This species is I think one of the common *Ribes* aecidia, but field observations indicate that we have others and that the more common one with large cups on much thickened spots has teleutospores on another *Carex*.

PUCCINIA RIPARIA Holway n. sp.

o. Spermogonia epiphyllous, very few, at first yellow, becoming darker.

I. Spots yellow, not thickened; aecidia hypophyllous, scattered, 1-6 in a cluster, or in greenhouse cultures covering a considerable portion of the leaf, margin recurved and split into 2-8 sections; aecidiospores hyaline, globose, minutely roughened, 22-26 μ , mostly 22 μ in diameter, walls thin.

II. Uredosori hypophyllous, oblong, brown; uredospores borne on hyaline pedicels 35-40 μ long, from which they easily fall when mature, brown, echinulate spines about 3 μ apart, wall about 2 μ thick, germ-pores 3, 26-33 x 22-26 μ .

III. Teleutosori hypophyllous, oblong, soon breaking through the epidermis which is persistent around them; teleutospores oblong to oblong-clavate, constricted at the septum, 30-40 x 13-15 μ ; apex strongly thickened, 7-11 μ , mostly 7-8 μ ; pedicel tinted, up to the length of the spore; upper cell mostly rounded, rarely pointed or truncate in the mature spore, 16-19 x 11-15 μ ; lower cell narrower, 13-19 x 10-12 μ ; wall thin.

o. I. On *Ribes floridum* L.Her., II. III. on *Carex riparia* Curt. The species described above were collected at Decorah, Ia., by the writer. The aecidium on *Ribes floridum* was first observed in 1901. In 1902 a tuft of the *Carex* covered with the *Puccinia* was tied onto a clump of the *Ribes* which had never been attacked by any aecidium, and on June 16 many specimens of the aecidium were collected. On May 6, 1903, teleutospores were sown in the greenhouse on *Ribes floridum* and aecidia were mature May 22; a second sowing was made May 15; spermogonia appeared May 23 and aecidia May 30. Sowings made the same days on *Urtica* and *Ribes gracile* were without result.

This aecidium is very distinct from any other *Ribes* aecidium, having white spores as well as white peridia; the spermogonia are very few. *Puccinia albiperidia* has small, round, brown teleutospores, not surrounded by the epidermis, while those of *P. riparia* are oblong, black, and with the ruptured epidermis very noticeable. Good uredospores of the former have not been collected; Dr. Aruthur describes them as small. These two species appear to be quite distinct from European species, which all have teleutospores of the *Puccinia Urticae-Caricis* type, with much larger and darker teleutospores, the smallest measurements given by Klebahn being $37-56 \times 15-21\mu$.

PUCCINIA MODICA Holway n. sp.

Sori amphigenous, round or elongated, $\frac{1}{2}$ -1 mm.; uredosori brown; uredospores globose, closely and evenly tuberculate, yellowish-brown, $20-24\mu$, germ-pores 4-5, scattered; teleutospores black, pulverulent; teleutospores broadly elliptical, brown, smooth, $36-40 \times 24-32\mu$, wall thick, up to 4μ , apex rounded, $4-8\mu$ thick, pedicel persistent, hyaline, up to 120μ long; one-celled teleutospores occur.

Mexico; on *Arenaria* sp.; Etla, Oaxaca, No. 5401 (type); Oaxaca, No. 5415; on *Arenaria peyrishii*; Cuernavaca No. 5271; all collected by the writer in 1903; on *Arenaria* sp., Tumbala, Chiapas, No. 3343, E. W. Nelson, 1895; near Salazar, No. 7039 and on *Arenaria reptans*, No. 7038, both by Rose and Painter in 1903.

PUCCINIA ECHINOPTERIDIS Holway n. sp.

II. Uredosori brown, amphigenous, mostly on the under side of the leaves and on the stems, circinate in small groups, globose to oblong, or irregular and confluent; spots pale yellow; uredospores light brown, globose to ovate, $26-33 \times 22-26\mu$ coarsely echinulate.

III. Teleutospores amphigenous, black, pulverulent, small, becoming confluent; teleutospores globose to broadly elliptical, not constricted, wall nearly uniform in thickness, sometimes slightly

thickened opposite the pedicel, which is variously inserted, mostly laterally, often in line with the septum, and globosely inflated next the spores and about the same length, strongly verrucose-reticulate, $30-44 \times 22-37\mu$; dark reddish brown. On *Echinopteris Lappula* Juss., Guadalajara, Mexico, No. 5036 Sept. 25, 1903. Tehuacan, Puebla, Mexico, No. 5338, Nov. 7, 1903. Collected by the writer.

Closely allied to *Puccinia insueta* Wint., from which it varies in its entirely different uredospores and the much stronger reticulations of the teleutospores.

PUCCINIA RUBRICANS Holway n. sp.

Spots crimson, mostly circular, from 1-6 mm. in diameter, most leaves having a few large spots and numerous scattered small ones. Sori amphigenous, mostly hypophyllous, solitary, scattered, or circinate on the larger spots.

II. Uredosori light brown; uredospores pale brown, globose, rarely ovate, strongly echinulate, spines $3-4\mu$ apart, wall thick, $4-6\mu$, $36-44 \times 32-36\mu$.

III. Teleutospores following in the uredosori, black, teleutospores elliptical, ferruginous, strongly verrucose, $60-68 \times 40-44\mu$, apex shortly acute, or rounded, slightly thickened, pedicel hyaline, up to 80μ long.

Collected by the writer on *Heteropteris Portillana* Wats., Guadalajara, Mex., Sept. 28, 1903, No. 5063.

Holotype plates, from photomicrographs, will be distributed with the separates.

Minneapolis, Minn., May 20, 1903.

NOTES ON FUNGI. I. NEW OR INTERESTING AMERICAN UREDINEÆ.

BY P. L. RICKER.

AECIDIUM WILLIAMSI Ricker sp. nov.—Spots yellowish, somewhat thickened; peridia densely clustered, mostly hypophyllous, cylindrical or elliptical; spores pale yellow, subglobose, $19-26\mu$, minutely verrucose; wall medium, 2μ .

On leaves and stems of *Lithospermum angustifolium* Mx., Brookings, S. D., T. A. Williams, June 22, 1893. Specimens are also in the herbaria of the U. S. National Museum and Dr. J. C. Arthur.

This species is not related to *Puccinia lithospermi* E. & K., originally described on *Lithospermum canescens*; but which proves to be *Evolvulus pilosus* Nutt., the *Aecidium* of which is as yet undescribed, but which the author has recently had the opportunity of examining in the herbarium of Mr. M. A. Carleton of this Department.